Assessment of Air Quality in the Shuttle and International Space Station (ISS) Based on Samples Returned by STS-105 at the Conclusion of 7A.1

The toxicological assessment of air samples returned at the end of the STS-105 (7A.1) flight to the ISS is reported. ISS air samples were taken in August 2001 from the Service Module, FGB, and U.S. Laboratory using grab sample canisters (GSCs) and/or formaldehyde badges. Preflight and end-of-mission samples were obtained from *Discovery* using GSCs. Analytical methods have not changed from earlier reports, and surrogate standard recoveries were 64-115%. Pressure tracking indicated no leaks in the canisters.

The two general criteria used to assess air quality are the total-non-methane-volatile organic hydrocarbons (NMVOCs) and the total T-value (minus the CO_2 and formaldehyde contribution). Because of the Freon 218 (octafluoropropane, OFP) leak, its contribution to the NMVOC is indicated in brackets. When comparing the NMVOC values with the 25 mg/m^3 guideline, the OFP contributions should be subtracted. Control of atmospheric alcohols is important to the water recovery system engineers, hence total alcohols were also assessed in each sample. Formaldehyde is quantified separately. These five indices are summarized below:

Sample Location	Date/Type	NMVOCs (mg/m^3)	[OFP] (mg/m^3)	T Value[a] (units)	Alcohols (mg/m^3)	Formaldehyde (mg/m^3)
Lab-GSC	8/06/01	74	[67]	0.39	3.3	0.031
SM-GSC	8/06/01	82	[76]	0.28	3.6	0.028
FGB-GSC	8/06/01	140	[61]	8.47	74.4	ns
MPLM	8/13/01	25	[10]	1.39	5.2	ns
Shuttle middeck-GSC	7/12/01(preflt)	0.5	[0]	0.02	0.2	ns
Shuttle middeck-GSC	7/23/01(EOM)[b]	159	[151]	0.53	7.9	ns
Acceptable Guideline>>>		<25	[85000]	<1	<10	0.050

[a] Formaldehyde (methanal) and CO2 not included in T calculation.
[b]ns = not sampled and EOM = end of mission sample

The FGB sample contained an unprecedented concentration of methanol (71 mg/m3, T contribution = 7.9). Since concomitant samples in the SM and Lab showed typical levels of methanol, we suspect a momentary source in the FGB, somehow occurring at the same time as the sample was acquired.

The MPLM sample shows that the overall pollution level was acceptable for first entry (T=1.39); however, it also shows that it was not a true first-entry sample. This can be deduced from the presence of OFP (10 mg/m3) in the sample. This could have come only from spread of this pollutant from the ISS complex into the MPLM after the hatch was opened and before the sample was taken. The alcohol concentration in the MPLM (5.2 mg/m3) was not a significant impact to the ISS alcohol load.

Taken as a whole, these data suggest that air pollutants were controlled to acceptable levels to protect crew health. The increase in the average OFP concentration from 7A GSC samples, and the higher quantity in the SM GSC sample suggest that OFP was continuing to leak from an ISS system in the SM faster than it was being scrubbed from the air. The concentration of OFP was far below any that would cause a health concern. To the extent that the samples were representative of each respective vehicle atmosphere, there was no evidence that the MPLM or *Discovery* contributed significantly to the alcohol load in the ISS atmosphere.

Enclosures
1: Analytical Results of 7A.1 and STS-105 GSC Air Samples
2: T Values of 7A.1 and STS-105 Air Samples

TABLE 1
ANALYTICAL RESULTS OF
ISS 7A.1 AND STS-105 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)					
	AA03176 S/N 1006 LAB 8/6/01@ 11:47GMT	AA03177 S/N 1010 SERVICE MODULE 8/6/01@ 12:04 GMT	AA03178 S/N 1005 FGB 8/6/01@ 12:05GMT	AA03179 S/N 1052 MPLM 1 8/13/01@ 19:43GMT	AA03173 S/N 1011 PREFLIGHT 8/10/01@ 12:02EDT	AA03175 S/N 1048 MIDDECK 11\14:06MET 8/22/01@11:15GMT
TARGET COMPOUNDS (TO-14/POLAR)***						
FREON 12	TRACE	TRACE	<0.05	<0.05	<0.05	TRACE
CHLOROMETHANE	<0.05	<0.05	<0.05	TRACE	<0.05	TRACE
FREON 114	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
METHANOL	0.27	0.30	70.7	0.30	TRACE	0.11
ACETALDEHYDE	0.19	0.18	0.77	0.15	TRACE	0.14
VINYL CHLORIDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BROMOMETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ETHANOL	2.2	2.5	3.0	0.77	TRACE	2.6
CHLOROETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ACETONITRILE	TRACE	<0.05	TRACE	<0.05	<0.05	TRACE
PROPENAL	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05
ACETONE	0.20	0.20	0.19	2.2	TRACE	0.19
PROPANAL	TRACE	TRACE	TRACE	0.11	TRACE	TRACE
2-PROPANOL	0.32	0.34	0.25	1.3	0.06	4.9
FREON 11	<0.05	<0.05	<0.05	0.16	<0.05	<0.05
FURAN	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ACRYLONITRILE	TRACE	TRACE	TRACE	<0.05	<0.05	<0.05
PENTANE	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05
2-METHYL-2-PROPANOL	TRACE	TRACE	TRACE	0.06	<0.05	TRACE
METHYL ACETATE	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05
1,1-DICHLOROETHENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DICHLOROMETHANE	0.41	0.43	0.36	3.0	<0.05	0.31
3-CHLOROPROPENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
FREON 113	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05
N-PROPANOL	0.06	0.06	TRACE	0.06	<0.05	<0.05
1,1-DICHLOROETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BUTANAL	TRACE	TRACE	TRACE	TRACE	TRACE	<0.05
2-BUTANONE	TRACE	TRACE	TRACE	0.583	TRACE	TRACE
1,2-DICHLOROETHENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-METHYLFURAN	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ETHYL ACETATE	TRACE	TRACE	TRACE	0.09	<0.05	<0.05
HEXANE	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05
CHLOROFORM	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05
2-BUTENAL	TRACE	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-DICHLOROETHANE	TRACE	TRACE	TRACE	<0.05	<0.05	<0.05
1,1,1-TRICHLOROETHANE	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05
N-BUTANOL	0.19	0.22	0.14	0.55	TRACE	TRACE
BENZENE	TRACE	<0.05	<0.05	TRACE	<0.05	<0.05
CARBON TETRACHLORIDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-PENTANONE	TRACE	TRACE	TRACE	<0.05	<0.05	<0.05
PENTANAL	TRACE	TRACE	TRACE	TRACE	<0.05	TRACE
1,2-DICHLOROPROPANE	<0.05	TRACE	<0.05	0.18	<0.05	<0.05
1,4-DIOXANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TRICHLOROETHENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2,5-DIMETHYLFURAN	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4-METHYL-2-PENTANONE	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05
CIS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-PENTENAL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TRANS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2-TRICHLOROETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TOLUENE	TRACE	TRACE	TRACE	0.26	<0.05	<0.05
HEXANAL	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
MESITYL OXIDE	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05
1,2-DIBROMOETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BUTYL ACETATE	TRACE	TRACE	TRACE	TRACE	<0.05	<0.05
TETRACHLOROETHENE	<0.05	<0.05	<0.05	TRACE	<0.05	<0.05
CHLOROBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ETHYL BENZENE	TRACE	TRACE	TRACE	TRACE	<0.05	<0.05
M- + P-XYLENES	TRACE	TRACE	TRACE	TRACE	<0.05	<0.05
2-HEPTANONE	TRACE	TRACE	TRACE	<0.05	<0.05	<0.05
CYCLOHEXANONE	TRACE	TRACE	TRACE	TRACE	<0.05	<0.05
HEPTANAL	TRACE	TRACE	TRACE	TRACE	TRACE	<0.05
STYRENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-TETRACHLOROETHANE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
O-XYLENE	TRACE	0.05	TRACE	TRACE	<0.05	<0.05
1,3,5-TRIMETHYLBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-TRIMETHYLBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-TRICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HEXACHLORO-1,3-BUTADIENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

TABLE 1
ANALYTICAL RESULTS OF
ISS 7A.1 AND STS-105 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)					
	AA03176 S/N 1006 LAB 8/6/01@ 11:47GMT	AA03177 S/N 1010 SERVICE MODULE 8/6/01@ 12:04 GMT	AA03178 S/N 1005 FGB 8/6/01@ 12:05GMT	AA03179 S/N 1052 MPLM 1 8/13/01@ 19:43GMT	AA03173 S/N 1011 PREFLIGHT 8/10/01@ 12:02EDT	AA03175 S/N 1048 MIDDECK 11\14:06MET 8/22/01@11:15GMT
TARGET COMPOUNDS (TOXIC)						
1,3-BUTADIENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ETHYLENE OXIDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
CARBON DISULFIDE	TRACE	TRACE	TRACE	TRACE	<0.05	<0.05
2-METHYL-2-PROPENAL	<0.05	<0.05	TRACE	TRACE	<0.05	<0.05
3-BUTEN-2-ONE	<0.05	<0.05	TRACE	TRACE	<0.05	<0.05
DIMETHYLDISULFIDE	<0.05	<0.05	TRACE	<0.05	<0.05	<0.05
2-ETHOXYETHANOL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
OCTAMETHYLCYCLOTETRASILOXANE	0.57	0.33	1.2	0.70	TRACE	TRACE
NON-TARGET COMPOUNDS						
OCTAFLUOROPROPANE***	67.2	75.5	60.8	9.8	BL	151
CHLOROPENTAFLUOROETHANE	0.01	0.01	0.01	BL	BL	0.02
BROMOTRIFLUOROMETHANE	0.02	0.02	0.01	BL	BL	0.30
2-METHYLPROPANE	0.03	0.03	BL	0.03	BL	BL
TRIMETHYLSILANOL	0.07	0.05	0.06	1.7	BL	BL
1,3-DIOXOLANE	0.02	0.03	0.02	0.01	BL	BL
2-METHYLPROPANENITRILE	*0.004*	*0.005*	*0.004*	BL	BL	BL
CYCLOHEXANE	0.01	0.01	0.01	0.15	BL	BL
HEXAMETHYLCYCLOTRISILOXANE	0.99	0.89	1.8	1.9	0.14	0.02
LIMONENE	0.07	0.10	0.07	0.01	BL	0.003
DECAMETHYLCYCLOPENTASILOXANE	0.33	0.34	0.45	0.25	BL	0.01
TOTAL ALCOHOLS PLUS ACETONE	***3.3***	***3.6***	***74.4***	***5.2***	***0.16***	***7.9***
TARGET COMPOUNDS (GC)* **						
ETHYLENE	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
CARBON MONOXIDE	<1.1	TRACE	<1.1	2.4	<1.1	4.3
METHANE	0.75	0.73	0.71	1.9	1.1	21
HYDROGEN	<1.6	<1.6	<1.6	TRACE	<1.6	*10*
CARBON DIOXIDE	5300	5500	5700	1500	1341	3400
TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	**73.8**	**82.1**	**140**	**24.9**	**0.48**	**159**

<: Value is less than the laboratory report detection limit.

TRACE: Amount detected is sufficient for compound identification only. Calculations are based on one-half of the laboratory report detection limit (1.1 mg/m3 for CO; 0.2 mg/m3 for CH4; 1.6 mg/m3 for H2; 0.05 mg/m3 for VOCs; and 0.02 mg/m3 for propenal.)

BL: Area below the search routine limit (<20% of the fluorobenzene peak area).

***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.

NOTE: *High levels (above 1.5ppm) of Methanol, Ethanol, Acetone, Isopropanol and 2-Butanone are routinely reported based on calibrated GC-FID measurements.*

TABLE 2
ANALYTICAL RESULTS OF
ISS 7A.1 AND STS-105 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)				T-VALUE (7-d SMAC)	
	AA03176 S/N 1006 LAB 8/6/01@ *11:47GMT*	AA03177 S/N 1010 SERVICE MODULE 8/6/01@ *12:04 GMT*	AA03178 S/N 1005 FGB 8/6/01@ *12:05GMT*	AA03179 S/N 1052 MPLM 1 8/13/01@ *19:43GMT*	AA03173 S/N 1011 PREFLIGHT 8/10/01@ *12:02EDT*	AA03175 S/N 1048 MIDDECK 11\14:06MET *8/22/01@11:15GMT*
TARGET COMPOUNDS (TO-14/POLAR)***						
FREON 12	0.00005	0.00005	ND	ND	ND	0.00005
CHLOROMETHANE	ND	ND	ND	0.00061	ND	0.00061
FREON 114	ND	ND	ND	ND	ND	ND
METHANOL	*0.02984*	*0.03363*	*7.86053*	*0.03377*	*0.00278*	*0.01194*
ACETALDEHYDE	0.04675	0.04457	0.19182	0.03836	0.00625	0.03458
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND	ND	ND
ETHANOL	0.00112	0.00125	0.00151	0.00039	0.00001	0.00131
CHLOROETHANE	ND	ND	ND	ND	ND	ND
ACETONITRILE	0.00373	ND	0.00373	ND	ND	0.00373
PROPENAL	ND	ND	ND	0.33333	ND	ND
ACETONE	0.00389	0.00390	0.00357	0.04243	0.00048	0.00362
PROPANAL	0.00694	0.00694	0.00694	0.03040	0.00175	0.00175
2-PROPANOL	*0.00212*	*0.00228*	*0.00166*	*0.00879*	*0.00043*	*0.03275*
FREON 11	ND	ND	ND	0.00020	ND	ND
FURAN	ND	ND	ND	ND	ND	ND
ACRYLONITRILE	0.00893	0.00893	0.00893	ND	ND	ND
PENTANE	ND	ND	ND	0.00004	ND	ND
2-METHYL-2-PROPANOL	*0.00021*	*0.00021*	*0.00021*	*0.00050*	*ND*	*0.00017*
METHYL ACETATE	ND	ND	0.00021	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND
DICHLOROMETHANE	0.04062	0.04346	0.03582	0.29761	ND	0.00626
3-CHLOROPROPENE	ND	ND	ND	ND	ND	ND
FREON 113	ND	ND	ND	0.00006	*ND*	*ND*
N-PROPANOL	0.00058	0.00057	0.00026	0.00060	ND	ND
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
BUTANAL	0.00568	0.00568	0.00568	0.00568	0.00141	ND
2-BUTANONE	0.00083	0.00083	0.00083	0.01943	0.00083	0.00083
1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND
2-METHYLFURAN	ND	ND	ND	ND	ND	ND
ETHYL ACETATE	0.00014	0.00014	0.00014	0.00048	ND	ND
HEXANE	ND	ND	ND	0.00014	ND	ND
CHLOROFORM	ND	ND	ND	0.00500	ND	ND
2-BUTENAL	0.01471	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	0.02500	0.02500	0.02500	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	0.00016	ND	ND
N-BUTANOL	0.00486	0.00549	0.00349	0.01367	0.00031	0.00031
BENZENE	0.12500	ND	ND	0.12500	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND
2-PENTANONE	0.00036	0.00036	0.00036	ND	ND	ND
PENTANAL	0.00472	0.00472	0.00472	0.00472	ND	0.00118
1,2-DICHLOROPROPANE	ND	0.00060	ND	0.00440	ND	ND
1,4-DIOXANE	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	ND	ND	ND	ND	ND
2,5-DIMETHYLFURAN	ND	ND	ND	ND	ND	ND
4-METHYL-2-PENTANONE	ND	ND	ND	0.00018	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND
2-PENTENAL	ND	ND	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
TOLUENE	0.00042	0.00042	0.00042	0.00442	ND	ND
HEXANAL	0.00410	0.00410	0.00410	0.00410	0.00101	0.00101
MESITYL OXIDE	ND	ND	ND	0.00063	ND	ND
1,2-DIBROMOETHANE	ND	ND	ND	ND	ND	ND
BUTYL ACETATE	0.00013	0.00013	0.00013	0.00013	ND	ND
TETRACHLOROETHENE	ND	ND	ND	0.00074	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND
ETHYL BENZENE	0.00050	0.00050	0.00050	0.00050	ND	ND
M- + P-XYLENES	0.00011	0.00011	0.00011	0.00011	ND	ND
2-HEPTANONE	0.00109	0.00109	0.00109	ND	ND	ND
CYCLOHEXANONE	0.00042	0.00042	0.00042	0.00042	ND	ND
HEPTANAL	0.00357	0.00357	0.00357	0.00357	0.00089	ND
STYRENE	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
O-XYLENE	0.00011	0.00025	0.00011	0.00011	ND	ND
1,3,5-TRIMETHYLBENZENE	ND	ND	ND	ND	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND	ND	ND
HEXACHLORO-1,3-BUTADIENE	ND	ND	ND	ND	ND	ND

TABLE 2
ANALYTICAL RESULTS OF
ISS 7A.1 AND STS-105 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)				T-VALUE (7-d SMAC)	
	AA03176 S/N 1006 LAB 8/6/01@ 11:47GMT	AA03177 S/N 1010 SERVICE MODULE 8/6/01@ 12:04 GMT	AA03178 S/N 1005 FGB 8/6/01@ 12:05GMT	AA03179 S/N 1052 MPLM 1 8/13/01@ 19:43GMT	AA03173 S/N 1011 PREFLIGHT 8/10/01@ 12:02EDT	AA03175 S/N 1048 MIDDECK 11\14:06MET 8/22/01@11:15GMT
TARGET COMPOUNDS (TOXIC)						
1,3-BUTADIENE	ND	ND	ND	ND	ND	ND
ETHYLENE OXIDE	ND	ND	ND	ND	ND	ND
CARBON DISULFIDE	0.00156	0.00156	0.00156	0.00156	ND	ND
2-METHYL-2-PROPENAL	ND	ND	0.01471	0.01471	ND	ND
3-BUTEN-2-ONE	ND	ND	0.05814	0.05814	ND	ND
DIMETHYLDISULFIDE	ND	ND	0.12500	ND	ND	ND
2-ETHOXYETHANOL	ND	ND	ND	ND	ND	ND
OCTAMETHYLCYCLOTETRASILOXANE	0.04734	0.02790	0.10164	0.05825	0.00009	0.00009
NON-TARGET COMPOUNDS						
OCTAFLUOROPROPANE***	0.00079	0.00089	0.00071	0.00011	BL	0.00177
CHLOROPENTAFLUOROETHANE	0.00002	0.00002	0.00002	BL	BL	0.00002
BROMOTRIFLUOROMETHANE	0.00000	0.00000	0.00000	BL	BL	0.00003
2-METHYLPROPANE	0.00012	0.00012	BL	0.00011	BL	BL
TRIMETHYLSILANOL	0.00195	0.00141	0.00169	0.04695	BL	BL
1,3-DIOXOLANE	0.00064	0.00085	0.00055	0.00034	BL	BL
2-METHYLPROPANENITRILE	0.00049	0.00065	0.00059	BL	BL	BL
CYCLOHEXANE	0.00003	0.00003	0.00003	0.00073	BL	BL
HEXAMETHYLCYCLOTRISILOXANE	0.10996	0.09890	0.19782	0.21453	0.00155	0.00024
LIMONENE	0.00013	0.00017	0.00013	0.00003	BL	0.00000
DECAMETHYLCYCLOPENTASILOXANE	0.02174	0.02238	0.03002	0.01667	BL	0.00009
TARGET COMPOUNDS (GC)* **						
ETHYLENE	ND	ND	ND	ND	ND	ND
CARBON MONOXIDE	ND	0.05000	ND	0.21818	ND	0.39091
METHANE	0.00020	0.00019	0.00019	0.00050	0.00029	0.00553
HYDROGEN	ND	ND	ND	0.00235	ND	0.02941
CARBON DIOXIDE	0.40769	0.42308	0.43846	0.11538	0.10000	0.26154
TOTAL T-VALUE	**0.79733**	**0.70585**	**8.90910**	**1.49723**	**0.11654**	**0.78940**

ND : Value is less than the laboratory report detection limit.
BL: Area below the search routine limit (< 20% of the fluorobenzene peak area).
Note: Number of decimal places in T-Values do not represent significant figures of measurements.
***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.